



US010483096B2

(12) **United States Patent**
Manicke et al.

(10) **Patent No.:** **US 10,483,096 B2**

(45) **Date of Patent:** **Nov. 19, 2019**

(54) **DEVICE AND METHOD FOR ANALYSIS OF BIOFLUIDS BY ION GENERATION USING WETTED POROUS MATERIAL**

(51) **Int. Cl.**
H01J 49/04 (2006.01)
H01J 49/16 (2006.01)

(Continued)

(71) Applicant: **Indiana University Research and Technology Corporation**, Indianapolis, IN (US)

(52) **U.S. Cl.**
CPC **H01J 49/0413** (2013.01); **G01N 1/405** (2013.01); **G01N 1/4055** (2013.01);
(Continued)

(72) Inventors: **Nicholas Manicke**, Zionsville, IN (US);
Chengsen Zhang, Indianapolis, IN (US)

(58) **Field of Classification Search**
USPC 250/288
See application file for complete search history.

(73) Assignee: **Indiana University Research and Technology Corporation**, Indianapolis, IN (US)

(56) **References Cited**

U.S. PATENT DOCUMENTS

2011/0157580 A1* 6/2011 Nogami G01N 1/405
356/36

2011/0291004 A1 12/2011 Kanda et al.

(Continued)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 77 days.

(21) Appl. No.: **15/549,948**

FOREIGN PATENT DOCUMENTS

(22) PCT Filed: **Feb. 10, 2016**

WO 2009144560 A1 12/2009
WO WO2012/170301 A1 12/2012

(86) PCT No.: **PCT/US2016/017306**

§ 371 (c)(1),

(2) Date: **Aug. 9, 2017**

OTHER PUBLICATIONS

Extended European Search Report issued by the European Patent Office, Munich, Germany, dated Sep. 4, 2018, for European Patent Application No. 16749784.1; 15 pages.

(Continued)

(87) PCT Pub. No.: **WO2016/130646**

PCT Pub. Date: **Aug. 18, 2016**

(65) **Prior Publication Data**

US 2018/0033600 A1 Feb. 1, 2018

Primary Examiner — Kiet T Nguyen

(74) *Attorney, Agent, or Firm* — Faegre Baker Daniels LLP

Related U.S. Application Data

(60) Provisional application No. 62/114,287, filed on Feb. 10, 2015, provisional application No. 62/293,231, filed on Feb. 9, 2016.

(57) **ABSTRACT**

The present disclosure provides a mass spectrometry cartridge and methods of use thereof.

34 Claims, 25 Drawing Sheets

